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Army Service Forces
Quartermaster Corps
CLIMATIC RESEARCH LABORATORY

Monthly Report - 1 June 1944

1. Personnel

a. Eight enlisted men reported for duty. One man at Camp Lee and one at Fort Devens have been selected and are awaiting transfer to this organization. This completes the allotment of enlisted men allowed this organization.

2. Equipment

The Jungle Chamber which includes a Desert Section and an All Weather Section has been in operation for two weeks. The temperature range is from plus 40°F. to plus 140°F. The relative humidity range is from 10 percent to 99 percent. It is possible to have an overhead rain as well as a driving rain at temperatures ranging from plus 55°F. to plus 100°F. An improvised wind tunnel for study of fabrics on the copper cylinder has been installed in the laboratory. Wind velocities as high as 40 mph. are possible with it.

3. Reports

The following reports have been sent to the Office of The Quartermaster General, for the approval of Colonel G. F. Doriot:

Report No. 107 - 20 May 1944
Overcoat, Wool, Roll Collar versus Jacket, Field, M-1943, Thermal Insulation, Moisture Uptake and Utility.
Four Figures

This is a study designed to obtain information on the comparative performance of the Overcoat, Wool, Roll Collar versus the Jacket, Field, M-1943, when each is worn as an outer garment over a basic assembly of standard cold climate items.

The approach to the investigation involved the utilization of physiological and physical methods. The physiological procedures were conducted on soldiers trained as experimental subjects, in the Cold Room at temperatures below freezing, in the Temperate Climate Room at above freezing temperatures, in the Rain Section of the All Weather Chamber, and on maneuvers in the Parker State Forest, respectively. The physical experiments were conducted in the Physics Laboratory.

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The inquiry may be divided into four phases.

a. Precise measurements of protection against wet cold and dry cold were made in the Cold Room by determining duration of tolerance at rest. This was done to simulate guard duty in a foxhole during waking hours. The Cold Room temperature was maintained either at plus 20°F. or 0°F., temperatures that are believed to be representative of winter conditions for certain combat areas in the Western World. In the wet cold experiments the complete uniform assembly from underwear and socks to outer garments was saturated before being worn. This was planned since frequent and heavy precipitation may be encountered in such areas. The above tests were planned following a consideration of certain aspects of daytime routine.

b. Investigation of tolerance and comfort while sleeping in the Bag, Sleeping, Wool was carried out because of the importance of a reasonable amount of comfortable sleep as a means of maintaining optimum fighting efficiency. The adequacy of the size of the Bag, Sleeping, Wool when occupied by soldiers dressed in the Basic Items plus the Jacket, Field, M-1943 or Overcoat, Wool, Roll Collar was studied, since it is important that there be no constriction of any protruding portion of the body such as top of head, shoulders, elbows, knees or feet. Thermal insulation was also investigated in relation to the proper disposition of the clothing, since it may be necessary for soldiers while fully clothed to use a sleeping bag. In this phase the complete uniforms were worn inside of the bag during certain experiments. During other experiments the outer garments were draped over the bag instead of being worn.

c. In the All Weather Chamber, the uniform assemblies were subjected to an artificial heavy rain in order to determine accumulation of moisture. This is important, because temperatures above freezing will be encountered and rain will be inevitable. Ranking equal in interest with information regarding ability of items to keep out rain, is knowledge regarding the function of the items when wet. In this phase physical studies of maximum water uptake of the assemblies were conducted by soaking the clothes to simulate immersion which would accompany fording of streams, swamps, etc.

d. Finally, certain aspects of utility in the field were studied. Soldiers were outfitted with full field equipment and observed while on maneuvers in a nearby forest. Ease of packing the outer garments in a field pack when not needed because of warmer temperature, utility of same in mounting and dismounting vehicles, attacking through woods and brush and climbing embankments were investigated.

The conclusions emanating from this study were definitive and consistent. In none of the phases was the Overcoat, Wool, Roll Collar shown to be superior to the Jacket, Field, M-1943, when either was worn as an outer garment. In fact, the reverse was observed in several instances.

The field jacket is superior in keeping out rain and wind, utility in the field when dry, and utility in the All Weather Test Chamber when wet. In the other phases there was no significant difference between the two items.

The recommendations that follow such conclusions are axiomatic and inevitable. As an item of issue for Climatic Zones 2 and 3, wet and dry, the Jacket, Field, M-1943 is to be preferred to the Overcoat, Wool, Roll Collar.

Report No. 87 - 25 May 1944
Bag, Sleeping, Wool, Experimental for Climatic Zones 2 and 3.
Thermal Insulation and Utility.
Seven Tables and Six Figures

A study has been made of the thermal insulation and other physical characteristics of seven varieties of wool sleeping bags under consideration for use in Climatic Zones 2 and 3. Comparison was made with the Bag, Sleeping, Wool, Standard (ordinarily used in pairs) and the Bag, Sleeping, Mountain, Standard. In many instances the bags were inclosed by a Case, Water-Repellent, for Bag, Sleeping, Mountain.

A total of sixty-six individual tests which involved more than two hundred and seventy experimental subject hours of testing are considered. All of the tests of thermal insulation were conducted in the Cold Room. The exposure temperature was maintained at either one of three levels, i.e., plus 30°F., plus 10°F., or 0°F. The air velocity was not greater than 3 mph. and was turbulent. The tests were performed with the sleeping bags placed on the false wooden floor without the use of a comforter between bag and floor. In some experiments a thermocouple blanket (single layer lightweight duck) was used for obtaining a temperature pattern beneath the sleeping bags.

The wool batt bags made a commendable showing in regard to thermal insulation while relatively new and unlaundered. They were not, however, the equal of the standard feather-filled Bag, Sleeping, Mountain. On the other hand, they were superior to a combination of two Bags, Sleeping, Wool, Standard. The experimental wool pile bags were inferior to the wool batt bags. It was concluded that wool batts, while relatively new, are an acceptable but not an equivalent substitute for feathers in regard to thermal insulatory properties.

At plus 30°F. the wool batt bags were adequate for all experimental subjects. At an exposure temperature of plus 10°F. the wool batt bags were adequate for 6 hours for approximately half of the experimental subjects. It is probable that plus 20°F. is the lower limit of adequacy for the bags for most soldiers.

Before this study was completed, information was made available regarding the significant degree of shrinkage by the wool batts following laundering. All aspects of the experimental work were not completed on this account. It seemed expedient to wait until a satisfactory process is devised to prevent shrinkage of wool batts before completing the study. Since the data accumulated are definitive, they are presented for consideration at this time.

4. In the Provisional Reports during the past month, tests on the following items were discussed:

Hospital Ward Tent
Cold Climate Footgear, Traction of Same
Solid Fuels
Water-Repellency, Experimental Jackets and Trousers
Under Protection for Sleeping Gear
Protective Cases for Sleeping Gear
Plethysmo-Calorimeter
Cold Climate Clothing
Thermal Properties of Fabrics
Mitten Shell, Trigger Finger, Experimental, Moisture Uptake.

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